

AI
Corrected.
upon expiration of a timing interval as determined by the timing means, the first power intensity from the power supply not being sufficient to actuate the firing element.

REMARKS

Claims 14-29 are pending. Claim 14 is amended for clarity and formatting only. Reconsideration in view of the above amendments and following remarks is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten claim (37 C.F.R. §1.121(c)(ii).

Applicants appreciate the entry of the Amendment filed April 2, 2001 and the acknowledgement in the Office Action mailed June 19, 2001 that all previous 35 U.S.C. §112 issues have been eliminated. Applicants note, therefore, that claims 20 and 21 are not currently rejected. Accordingly, Applicants presume that claims 20 and 21 are allowed. Applicants appreciate the implicit recognition of claims 20 and 21 as allowed. Should any other interpretation of the status of claims 20 and 21 be intended, Applicants' respectfully request clarity of the same.

In paragraph 9 of the Office Action, claims 14-17 are rejected under 35 U.S.C. §102(b) as anticipated by Hedberg et al. The rejection is respectfully traversed.

To maintain a 35 U.S.C. §102 rejection a reference must teach each and every element of the claimed invention. Hedberg et al. do not do so.

Applicants' invention comprises a priming device for firing a detonator comprising at least an electrical power supply providing a first power source to a timing circuit for timing the action of a firing element of a primer and a power generating means that provides, through a resistive circuit, a second power source of a sufficient intensity to actuate the firing element upon expiration of a timing interval. Thus, the electrical power supply provides current enough to drive a timing device, whereas the power generating means provides

current enough to fire the detonator firing element of the primer only after the designated time interval has expired. The power generating means includes a capacitor, a switch means, and a controlling means, whereby the controlling means controls the charging of the capacitor for a designated time by controlling the switching means that closes the circuit to the capacitor. By closing the switching means the capacitor becomes sufficiently charged to fire the detonator firing element of the primer when the capacitor is discharged. None of the applied art teach disclose or suggest the combination of features claimed.

Hedberg et al. (U.S. Patent No. 4,145,970) disclose a detonator cap 1 including a single explosive charge 2 connected to a firing means 3 having an electric filament 4 therein. The electric filament 4 is connected to a capacitor 5 controlled by a first control means 8 and a second control means 14 based upon current or induction signals (column 3, lines 21-31). In Hedberg et al., in the case of environmental electromagnetic pulses, ignition of the detonator can occur as there is no resistor or filter to limit the power intensity from those pulses (Figure 2). Applicants' invention provides that the first power source is of an intensity that is insufficient to ignite the firing element of the primer. Hedberg et al. disclose just the opposite, i.e., that a first power source is sufficient to ignite a detonator. The isolating transformer 17 and/or voltage limiting circuit 18 cited in the Office Action are not for inhibiting the firing of the detonator but are instead for protecting the electrical components that always carry sufficient power to ignite the detonator (col. 3, lines 46-64). Thus, nothing in Hedberg et al. teach, disclose or suggest that a first power intensity is insufficient to ignite the detonator as in the claimed invention. Accordingly, the structure and function of Hedberg et al. is different than that claimed and cannot be the basis for a 35 U.S.C. §102 rejection of any sort. Therefore, withdrawal of the 35 U.S.C. §102(b) rejection of claims 14-17 is respectfully requested.

In paragraph 12 of the Office Action claims 14-19, 22, 25 and 26 are rejected under 35 U.S.C. §102(e) as anticipated by Beukes et al. (U.S. Patent No. 6,085,659). The rejection is respectfully traversed.

Applicants invention is set forth in detail above.

Buekes et al. disclose a detonator 10 using an electronic explosive initiating device 12 including a circuit 14 electrically linked via a bonding wire 40 to a substrate 34 having a circuit pattern including a first capacitor C_1 that stores energy to operate the circuit via a second capacitor C_2 , a first control unit 70, and a second control unit 72 (column 4, line 51-63). As asserted in reply to the previous Office Action (mailed October 2, 2000), it is not a voltage which ignites the detonator but is an energy equal to $\frac{CV^2}{2}$ in the case of a capacitor in Beukes et al. It is clear, that an increase in the percentage of voltage increases the energy more than the same percentage of the capacity. However, it is very dangerous to have several devices using different voltages as it can lead to energy transference and to the ignition of the detonator. Such is distinctly different from the claimed invention wherein a unique low voltage (6V) for the supply of the module and for the ignition of the detonator is provided. Moreover, the low, no fire voltage range disclosed in Beukes et al. is for identifying the location of detonators that are provided with informational coding requiring the detonator be "powered up" at some "no fire voltage" level in the field (col. 7, lines 5-11). An altogether separate source 72 controls/assigns delay periods corresponding to the identification codes provided (col. 6, line 66- col. 7, lines 1-4). Such is contrary to the single electric power supply source with power generating means for driving a timing circuit with power insufficient to set off the firing element of a primer whereas the capacitor based power generating means provides a second power source of sufficient intensity to permit firing of the primer. Thus, as set forth with respect to Hedberg et al. earlier, Beukes et al. fail to teach,

disclose or suggest the combination of features claimed. Accordingly, withdrawal of the 35 U.S.C. §102(e) rejection of claims 14-19, 22, 25 and 26 is respectfully requested.

In paragraph 16 claims 23 and 24 are rejected under 35 U.S.C. §103(a) as unpatentable over Beukes et al. in view of Jarrott et al. (U.S. Patent No. 4,632,031). The rejection is respectfully traversed.

Applicants invention is set forth in detail above.

Beukes et al. is set forth in detail above as well.

Jarrott et al. fail to overcome the deficiencies of Beukes et al. Accordingly, withdrawal of the 35 U.S.C. §103(a) rejection of claims 23 and 24 on the basis of Beukes et al. in view of Jarrott et al. is respectfully requested.

In paragraph 18, of the Office Action claim 27 is rejected under 35 U.S.C. §103(a) as unpatentable over Beukes et al. The rejection is respectfully traversed.

Applicants invention is set forth in detail above.

Beukes et al. is discussed in detail above. Beukes et al. fail to teach, disclose or suggest the combination of features claimed for the reasons set forth above. Accordingly, withdrawal of the 35 U.S.C. §103(a) rejection of claim 27 is respectfully requested.

In paragraph 20 of the Office Action claims 28 and 29 are rejected under 35 U.S.C. §103(a) as unpatentable over Beukes et al. in view of Powell (U.S. Patent No. 5,877,696). The rejection is respectfully traversed.

Applicants invention is set forth in detail above.

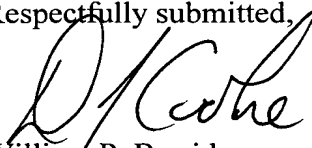
Beukes et al. is set forth in detail above as well.

Powell fails to overcome the deficiencies with respect to Beukes et al. Accordingly, withdrawal of the 35 U.S.C. §103(a) rejection of claims 28 and 29 on the basis of Beukes et al. in view of Powell is respectfully requested.

Reconsideration of the application is respectfully requested. It is submitted that claims 14-29, in view the remarks made herein, patentably distinguish themselves over the art applied and pose no 35 U.S.C. §112 issue. Accordingly, allowance of claims 14-29 is respectfully requested.

Should the Examiner believe anything further is desirable to place the application in even better form for allowance, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,



William P. Berridge
Registration No. 30,024

Dermott J. Cooke
Registration No. 41,685

WPB:DJC/jam

Attachment:
Appendix

Date: October 12, 2001

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>
--

APPENDIX

Changes to Claims:

The following is a marked-up version of the amended claims:

14. (Amended) A priming device for a detonator, comprising:
- timing means for timing the action of a firing element of a primer; ~~and~~
- an electrical power supply that provides a first power intensity to the timing means; and
- power generating means, the power generating means capable of generating, through a resistive circuit, a second power intensity sufficient to actuate the firing element upon expiration of a timing interval as determined by the timing means, the first power intensity from the power supply not being sufficient to actuate the firing element.